WRS
GT Co.

INLAND SEAS ENGINEERING

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Phone (231) 933-4041
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October 22, 2003

VIA Next Day UPS
Mr. Philip Roycraft
District Supervisor
MDEQ-WMD
Cadillac District Office
120 W. Chapin
Cadillac, Michigan 49601-2158

Mr. Michael Stifler, P.E.
District Supervisor
MDEQ-WD
Cadillac District Office
120 W. Chapin
Cadillac, Michigan 49601-2158

Re: Consent Order No. 31-07-02
Compliance Program Sections:
IV(4.1)(a.)(4.), IV(4.1)(d.)(1.), IV(4.1)(c.)(1.)(iv.) and II(2.4)
Secondary Containment Work Plan Supplemental Submission
Williamsburg Receiving & Storage
ISE Project # 02633061-34E

Gentlemen:

This communication is intended to provide Michigan Department of Environmental Quality (DEQ) staff the Work Plan Supplement required pursuant to the referenced Consent Order (CO) and the September 19, 2003 Correspondence from Sy Paulik of MDEQ received on September 22, 2003. This submission is a supplement to the Secondary Containment Work Plan dated February 12, 2003.

The referenced MDEQ letter of September 19, 2003 (MDEQ Review) provided a review of the February 12, 2003 Secondary Containment Work Plan and included a requirement for delivery of additional information. The MDEQ Review also addresses questions/comments regarding the Storm Water Pollution Prevention Plan (SWP3). This submittal is formatted in accordance with Section V of the referenced CO and headings below relate to specific sections there under. I encourage the users of this submittal to contact me with any questions they may have.

Consent Order Section IV(4.1)(a.)(4.)- MDEQ Review Page 1, Paragraph 1.
The Site Plan included with the February 12, 2003 submittal included a design drawing for a storm water retention/infiltration basin to be constructed north of the maintenance building. The design drawings provided for a structure capable of retaining storm water from a 2.5-inch intensity storm event. The probability of such an event is considered less frequent than once in 100 years. The design considered the potential for discharge of retained storm water out an emergency overflow structure should the storm water volume considerably exceed 2.5 inches or if infiltration through the sand soils be impeded.

The structure was observed by MDEQ staff in its partially completed state on September 3, 2003. The structure was not constructed as designed. Revisions to the design undertaken by WRS include the elimination of an emergency overflow structure. Accordingly, ***there is no outlet for surface water discharge of any storm water retained in this structure***. Site grading plans remain essentially unchanged to the effect that the storm water runoff, collection and retention areas depicted in the SWP3 document and the attached Site Plan are consistent. The attached Site Plan shows the construction of the storm water retention structure, "As-Built".

Consent Order Section IV(4.1)(a.)(4.) - MDEQ Review Page 1, Paragraph 2.
This portion of the MDEQ Review states that MDEQ Staff witnessed a discharge of brine to the retention basins east of the eastern cherry brining pits on May 2, 2002 and subsequently discussed the matter with Messrs. Banwell and Hubbell that date while visiting the site. Based upon my interview with Mr. Hubbell, WRS maintains its adherence to the terms of the CO, Section 1.6 in particular.

Consent Order Section IV(4.1)(c.)(1.)(iv.) - MDEQ Review Page 1, Paragraph 2.
The MDEQ Review suggests that the data provided to MDEQ in the August 7, 2003 letter from Inland Seas Engineering, Inc.(ISE) to MDEQ indicates that BOD is "elevated above storm water levels". The data submitted in ISE's August 2003 letter to MDEQ is derived from compliance activities required under Section 4.1(c.)(1.)(iv.) of the CO. ISE respectfully suggests that the preponderance of these data do not indicate any contribution of brining or transfer operations upon storm water quality. The specific chemical characteristics indicative sodium/calcium chloride brine is not evident in any of the sample analytical results.

ISE does not have access to any database containing BOD analyses for storm water for this region or this land use scenario that would allow us to confirm or refute MDEQ's observations regarding the relative levels of BOD in storm water. It would seem from a purely mathematical standpoint that such a database would be required for objective evaluation of BOD analytical results for storm water. In absence of analytical results affirming a chemical specific fingerprint with that of cherry brine, we have concluded that there is no evidence of impact of these operations upon storm water discharged to these basins.

Consent Order Section IV(4.1)(d.)(1.) - MDEQ Review Page 1, Paragraph 2.
The May 2, 2002 date cited in the MDEQ Review precedes the date of the CO by several months. In accordance with CO terms, WRS has changed its operating practices to a considerable degree since the date of the alleged discharge. On January 17, 2003 (7 months after the May 2nd date) the SWP3 was submitted to MDEQ pursuant to Section 4.1(a) of the CO. Included in this submittal were two (2) Standard Operating Practices (SOPs) dealing with brined cherry and raw brine transfer operations. Another SOP considering spill response and reporting practices was also included in the January 17th SWP3. These practices have been employed by WRS since November 2002.

WRS also indicated during the September 3, 2003 meeting with MDEQ Staff at the WRS facility that WRS endeavors for continuous improvement in operating practices to mitigate the potential for a spills and the attendant loss in productivity responding to same. In accordance with this on-going effort for improved operations, WRS has revised the SOP dealing with brined cherry and raw brine transfer operations. The revisions result in fewer connections in the product transfer conveyance system. This presents fewer opportunities for introduction of human error and into fewer sources of mechanical failure of transfer conveyance materials. This was communicated to MDEQ Staff on September 3, 2003. Attached is a revised (09-10-03) version of SOP-6, "Loading and Unloading of Transport Vehicles".

Currently, all operations resulting in transfer of brined cherries, raw or spent brine to/from the plant site to/from the brining pit areas is accomplished by tanker truck. During transfer operations, only two (2) hoses (suction and discharge) are used on the transfer pump. These are physically inserted and secured into the tanker truck and a brining pit or fiberglass feed stock vessel within the plant. The pump is located within a "drip pan" during pump operations so that each of the hose connections has containment for drips or leaks.

Rule 5 [MAC R 324.2005(1)] of Part 5 Rules promulgated under Part 31 of NREPA indicate that secondary containment structures are required for any on-land facility that has any outdoor storage areas used to ***store*** liquid polluting materials in excess of regulatory thresholds. Since the secondary containment provisions of Rule 5 relate to ***storage*** of brine at this site and not to transfer vessels or equipment, secondary containment of the transfer equipment is limited to best management practices described in the enclosed SOP-6.

Application of Part 5 Rules to the storm water retention basins east of the brining pits indicate that secondary containment structures are not required for storm water retention basins since these structures are not used to ***store*** polluting materials. These storm water structures exist within a ***Use Area*** as defined under Part 5 Rule 324.2002(h). This ***Use Area*** is maintained and operated (refer to SOPs within the SWP3) to prevent the release of polluting materials in accordance with Part 5 Rule 324.2005(3).

Data collected pursuant to CO requirements (see preceding section) does not indicate that polluting materials are conveyed to these retention basins via storm water. One may reasonably conclude that operating and maintenance practices (SOPs) designed to mitigate the potential for brine releases appear to be successful at achieving the stated intent of Part 5 Rules with regard to ***Use Area***. Work Plans for development of ***Secondary Containment Structures*** for the brining pits (outdoor storage) are provided below.

Consent Order Section IV(4.1)(d.)(1.) - MDEQ Review Pages 1 and 2, Paragraph 3.

STORM WATER RUNOFF AND BRINE MIXING PROCESSES

The MDEQ Review cites several elements of the February 12, 2003 submittal that were not included or require clarification. Paragraph 3 identifies that the SWP3 document and the Storm water runoff diagram offer contradicting versions of how retained storm water are handled. This matter has been addressed above and the "As-Built" condition of the storm water retention basin is included on the attached Sheet, "As-Built Site Plan (10-20-03) Storm water Structural Control Improvements and Brine Mixing Area" (Site Plan).

Inspection of the Site Plan reveals two significant revisions relative to the Site Plan included within the February 2003 Work Plan. These are:

- Elimination of any discharge structure for the conveyance of storm water out of the retention/infiltration basin
- Removal of Brine Mixing Tanks and Equipment

The Site Plan (storm water flow schematic) submitted with the February 2003 Work Plan depicted the former location of Brine Mixing Tanks and Equipment in the area east of the Maintenance Building. Brine is typically manufactured in conjunction with sweet cherry harvest. Brining cherries are received at the facility and placed in brining pits with manufactured brine. Without an appreciable harvest of brine cherries for the past two seasons, brine mixing equipment is not necessary and the brine manufacturing process is not operative. Brine was not manufactured at the WRS Site during the past two (2) harvests.

Bulk brine make-up chemicals are not stored at the WRS facility. Brine make-up chemicals once stored in the Warehouse and Maintenance Building were returned to the supplier in August 2002. The brine manufacturing process may not return to the WRS facility. WRS is currently evaluating brine reuse and reclamation processes as well as importing brine to the site from other sources by tanker truck.

If the brine manufacturing process returns to the WRS facility, then the brine mixing operation will be designed, constructed, maintained and operated to prevent the release of polluting materials in accordance with Part 5 Rule 324.2005(3). If required, brine mixing processes will be conducted within the Plant Building, most probably within the Pitting and Stemming process area. Bulk solid make-up chemical storage will be within the Warehouse Building with bagged chemicals stored on pallets in compliance with Part 5 Rule 324.2005(4).

WATER FLOW FOR THE ENTIRE FACILITY

The MDEQ Review cited elements the following elements missing from water flow schematics submitted with the February 2003 Work Plan:

1. Water supply wells and piping
2. Sanitary sewer system
3. Process water piping inside the plant

Consent Order Section IV(4.1)(d.)(1.) - MDEQ Review Pages 1 and 2, Paragraph 3.

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Attached please find Figures 1 and 2, the Water Supply and Sanitary Wastewater Flow Schematics, respectively. Also attached are Figures 3 through 8, the Process Water Flow Schematic. These are arrayed in serial fashion in the context of cherry processes from start to finish.

Consent Order Section IV(4.1)(d.)(1.) - MDEQ Review Page 2, Paragraph 1.
Long term plans for brine storage and mixing operations include relocation from outdoor to indoor areas as WRS represented at the September 3, 2003 meeting with MDEQ Staff at WRS. The February 2003 Work Plan provided an outline for development of ***Secondary Containment Structures*** (SCS) for outdoor storage areas and a schedule for evaluating feasible options. The feasibility evaluation was completed in September 2003.

where is this? what is the result of finding?

WRS representatives met with MDEQ Staff in Cadillac on October 13, 2003 to present conceptual plans for SCS for brining pits. The conceptual plan presented is a variant of typical in-ground cherry brining vessels constructed at receiving stations and processing plants throughout the United States. The WRS conceptual proposal included a double liner in-ground system with interstitial monitoring for surveillance. The conceptual approach presented to MDEQ considered that SCS for brining pits would comply with Rule 324.2005 for performance against technical requirements and include surveillance of inventory within the primary storage vessels for enhanced surveillance of the system. MDEQ provided comments useful for development of detailed Work Plans leading to implementation of the proposed conceptual SCS for brining pits.

WORK PLAN FOR COMPLIANCE WITH MAC R 324.2005 FOR OUTDOOR BRINE STORAGE AREAS

Design

The following are performance requirements for brine pit SCS under the provisions of MAC R 324.2005 :

- # 1 Construct SCS using impervious, compatible materials capable of containing liquid polluting materials so that spills or leaks may be recovered.
- # 2 Construct secondary containment structures so that polluting materials cannot escape to surface water or groundwater.
- # 3 Provide a capacity for containment of 100% of the contents of the largest storage container or 10% of the total volume of containers, whichever results in a greater SCS volume.
- # 4 Allow surveillance of the containers and the timely detection of any leaks and recovery of any spillage.
- # 5 Allow for the removal and proper disposal of any captured precipitation.

not accurate

The technology currently utilized for brining pits consists of a polyvinyl chloride (PVC) liner placed into an excavation prepared to receive the PVC liner. Within this lined excavation, brine and sweet cherries are placed. Upon placement of the cherries and brining solution, the pit is covered with a 6-mil (0.06-inch thick) polyethylene cover to seal the vessel and secure it from the elements and maintain a sanitary condition within the brining vessel.

The absolute value of interstitial volume resistivity is not the primary sensory objective. Rather, statistically significant excursions of interstitial volume resistivity measurements are the key surveillance indicators. It is expected that baseline or mean resistivity will be unique for each pit and that this baseline value may drift over time due to condensation of water vapor from air, seasonal changes in ground temperature, aging of materials of construction, measurement equipment drift, operator measurement error, etc. Therefore, it is proposed that statistical evaluation of resistivity measurement be used for surveillance of the integrity of the primary container.

Initial plans for statistical evaluation include the use of Statistical Process Control (SPC) to determine when resistivity readings deviate significantly from norms. An overview of SPC Control Chart techniques are included in attached excerpts from, "*Guide to Quality Control*", by Dr. Kaoru Ishikawa. These techniques are predicated upon understanding of the nature of the population distribution of resistivity measurements. Evaluation of the measurement data will include normalcy/log-normalcy testing or non-parametric analyses of the data to determine the appropriate statistical evaluation techniques. Such evaluations are included in MDEQ Guidance Document, "*Sampling Strategies and Statistical Training Material for Part 201 Clean-up Criteria*", by MDEQ (2002).

When significant deviation from mean or baseline resisitivity is confirmed, response action (operator intervention) is triggered. In this manner, secondary containment criteria #4 is achieved. Surveillance measurements are proposed to be obtained at a minimum once daily.

W/ interstitial monitoring

Construction

Construction methods will be similar to those currently used for brining pits. To the extent practical, the excavation will be shaped to provide uniform geometry and side slopes with a uniformly sloping base leading to a low end. Hydrostatic testing of secondary and primary containing liners will be undertaken to assure that both liner materials are "tight". In this manner, compliance with secondary containment criteria #2 is enhanced and compliance with criteria #1 is demonstrated.

Operations

In the case of a statistically significant excursion toward lower interstitial resistivity, the primary container would be emptied and the primary liner removed. Observation and inspection of the primary liner would be undertaken as well as observation of the interstitial area to assess if fluid has accumulated. If fluid accumulation is evident within the interstitial volume, it would be removed and fresh water introduced into the secondary containment. The pit would then be resealed and fluid levels monitored for a minimum of seven (7) days to assess if there is any volume loss through the secondary containment liner. If the secondary containment liner is determined to be intact and "tight" the secondary containment volume would be pump to de minimum levels and the primary container liner would be replaced. The hydrostatic testing would then be repeated in the primary containment liner for the same period.

Where will water from testing be discharged?

what will determ repair or re

Leaks through the primary liner will be repaired upon detection or the liner may be replaced. Upon repair or replacement, hydrostatic testing will be undertaken for demonstration of primary liner integrity. This will occur prior to placing the vessel back into service. During this period a new baseline will be established for surveillance of the interstitial volume.

Other operational requirements include compliance with secondary containment criteria #5. The design and construction of the proposed SCS eliminate the potential for accumulation of precipitation within the secondary containment volume, since it is cover by both a primary containment liner and a sealing cover. The sealing cover is exposed to the elements and in practice does accumulate precipitation on the top of the primary container. If allowed to accumulate, this would consume the freeboard within the pit and eventually the potential would rise for displacement of brine out of the primary liner.

what is p to be done for precip on top sealed cover

when would be

Operation of the proposed SCS will include monthly inspection of freeboard within each pit to assure that accumulated precipitation is removed when appropriate. Other operational initiatives will also be undertaken to enhance the ability of surveillance measures by including visual and simple mechanical observations and measurements. Daily observation of the brining pit areas will be undertaken to monitor for gross system integrity and nominal fluid levels. Monthly measurement of fluid levels (freeboard) will be undertaken with a measuring tape to monitor for gross fluid volume loss over time. In this manner surveillance is not rested upon one technology or system, but incorporates operator involvement along with indirect surveillance of the interstitial volume.

Schedule for Deployment

Resistivity based leak detection is not new technology, however using this technique for surveillance and for triggering operator intervention in lined earthen brining pits is a new application. It is anticipated that the capital cost to implement secondary containment will be great. Therefore, it is proposed to phase-in deployment of the above-described SCS over time.

At this writing, ISE is constructing a bench scale model of the proposed SCS. This will be equipped with the materials and monitoring capabilities described herein and at the October meeting with Cadillac Water Division Staff. Brine from the WRS plant has been supplied and the bench-scale model will be filled on a scale basis with the actual material to be contained in primary and secondary liners. The model will be subjected to variations in environmental conditions to evaluate there effect upon resistivity measurements. Temperature and interstitial moisture variations will be evaluated. A release will also be simulated through the injection of brine into the interstitial volume.

Data recorded from this experiment will be evaluated using the statistical techniques described above. When sufficient data is developed in support of the surveillance theory, the proposed SCS will be field tested by construction of two (2) field scale test units. These will be operated for 90 days with recording of measurements, their statistical evaluation and charting.

alternative if test doesn't work

Assuming the surveillance theory is proven in the field, a report will be prepared and delivered to MDEQ Cadillac Staff documenting the performance of bench and field scale trials. This report will be submitted within 120 days (on or before April 12, 2004) of the initiation of field scale deployment and will contain raw measurements and statistical evaluation results. MDEQ's approval of the proposed SCS will be sought by WRS at that time. Upon approval of the proposed SCS, WRS would then implement installation of the approved SCS for bringing pits over a three (3) year period, with one third (1/3)of brining pits being upgraded each year. The first third of the pits would be upgraded to SCS compliance prior to July, 2004. expansion of time line

Please call me at (231) 933-4041 if you have any questions. I look forward to hearing from you.

Respectfully submitted,
INLAND SEAS ENGINEERING, INC.

Andrew Smits, P.E.
Environmental Engineering
Department Manager

cc: Mr. Christopher Hubbell
Mr. Joseph E. Quandt
Mr. Edgar Roy III
Mr. Richard D. Rusz- MDEQ/WD- Lansing

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Standard Operating Procedure No. 6

Loading and Unloading Transport Vessel

Williamsburg Receiving and Storage
10190 Munro Road
Williamsburg, Michigan

1.0 Introduction

The purpose of this Standard Operating Procedure (SOP) is to determine the Best Management Practices (BMP's) for loading and unloading product at Williamsburg Receiving and Storage

2.0 Referenced Documents

2.1 40 CFR Protection of Environmental, Chapter 1 Environmental Protection Agency, Subchapter D, Part 122- EPA Administered Permit Programs: The National Pollutant Discharge Elimination System

2.2 Standard Operating Procedure No. 2, Brine Transfer

2.3 Standard Operating Procedure No. 5, Spill Response, Pollution Prevention and Countermeasures

3.0 Terminology

3.1 Transport Vessel- Any vehicle that transports fresh cherries, brine cherries, by-products or finished products on local, state or federally maintained properties.

3.2 Absorbent Socks- Any spill prevention measure that will reduce the mobility of a spilled materials outside the desired area.

4.0 Significance and Use

Potential for accidental spills that may encounter storm water is increased during loading and unloading of these products from transport vehicles. Therefore, implementation of this SOP is intended to reduce the possibility of spills during transport of cherries, brine cherries, by-products or finished products.

5.0 Equipment

Spill Response Kit (SOP No. 5)
Fork Lift

6.0 Procedures:

6.1 Unloading of Transport Vehicles:

6.1.1 Fresh cherries into brine pits

i. Transport vessels must remain on impervious surfaces at all times.
ii. Utilize absorbent sock around the truck to provide a "dike" so that any potential spills are prevented from migrating.
iii. Transport cherries into the pits as specified in SOP No.2- Brine Transfer

iv. Respond to any spills as specified in SOP No.5- Spill Response, Pollution Prevention and Countermeasures.

6.1.2 Brine cherries from outside locations

i. Transport vessel to remain on impervious surfaces

ii. If transport vessel is found to be leaking upon arrival, immediately isolate the transport vessel.

a. Surround the truck with absorbent socks or booms

b. Determine the cause of the leaking

c. If possible utilize the wet-dry vacuum of other type device to capture any free liquid.

iii. If no viable signs of leaking are present

a. Back truck into the loading dock

b. Place absorbent socks

6.2 Loading of Transport Vehicles

6.2.1 Inspect the transport vehicle for safety and remaining residue to ensure that the truck is free of previous spills

6.2.2 Inspect the containers to be shipped for any potential spills or leaking containers.

6.2.3 Utilize containment socks around the ramp area, and around the truck to prevent any losses from migrating

6.2.4 Utilize standard industry packing techniques to load the transport vehicle

6.2.5 Inspect the transport vehicle prior to leaving the site

6.2.6 Respond to any spills as directed in SOP No. 5, Spill Prevention.

7.0 Reporting

Transporting Vessel Logs will be maintained in accordance with Williamsburg Receiving and Storages standard of practice, additional reporting is only required by this SOP by reference. For example, spill response.

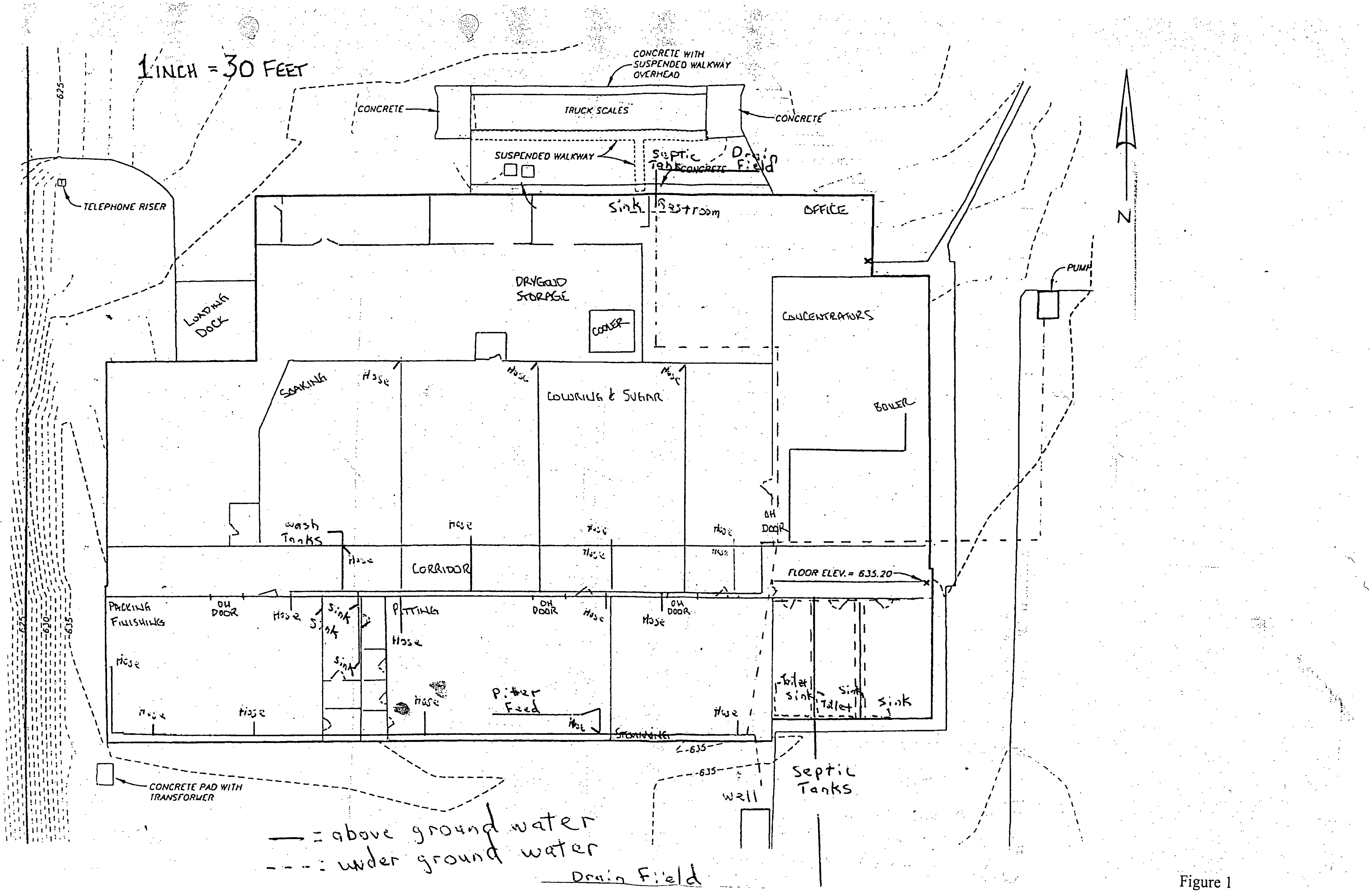

1 INCH = 30 FEET
CONCRETE WITH SUSPENDED WALKWAY OVERHEAD
CONCRETE
TRUCK SCALES
CONCRETE
SUSPENDED WALKWAY
Septic Tank
CONCRETE
Drain Field
TELEPHONE RISER
Sink
Restroom
OFFICE
N
PUMP
DRYGOOD STORAGE
LOADING DOCK
COOLER
CONCENTRATORS
SOAKING
Hose
COLORING & SUGAR
BOILER
wash Tanks
CORRIDOR
OH DOOR
FLOOR ELEV. = 635.20
PACKING FINISHING
PITTING
Sink
Pitter Feed
STEMMING
Toilet
sink
Toilet
Sink
635
630
625
CONCRETE PAD WITH TRANSFORMER
well
Septic Tanks
—— = above ground water
- - - : under ground water
Drain Field

Figure 1

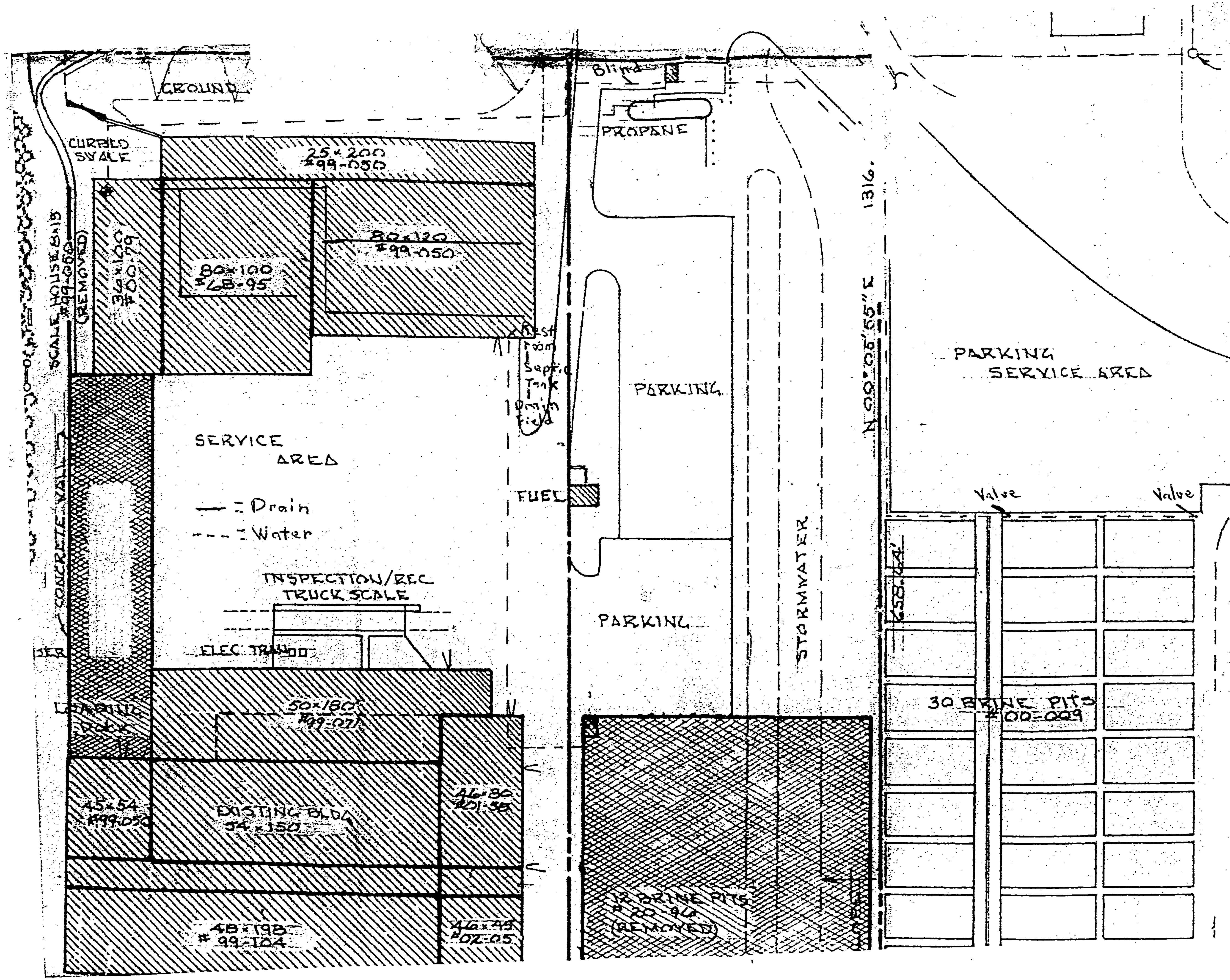

GROUND
CURBED SWALE
25×200 #99-050
80×120 #99-050
80×100 #68-95
34×120 #00-79
SCALE HOUSE 8×15 #99-050 (REMOVED)
CONCRETE WALL
Blind
PROPANE
Rest room Septic Tank Drain Field
PARKING
1316.
N 00°06'55" E
PARKING SERVICE AREA
N
SERVICE AREA
— = Drain
--- = Water
FUEL
Valve
Valve
INSPECTION/REC TRUCK SCALE
ELEC TRANS
PARKING
STORMWATER
658.44'
30 BRINE PITS #00-009
LOADING DOCK
50×180' #99-071
45×54 #99-050
EXISTING BLDG 54×150
46×86 #01-38
48×198 # 99-104
46×45 #02-05
12 BRINE PITS # 20-96 (REMOVED)

Figure 2

Williamsburg Receiving and Storage
Stemming and Pitting Process

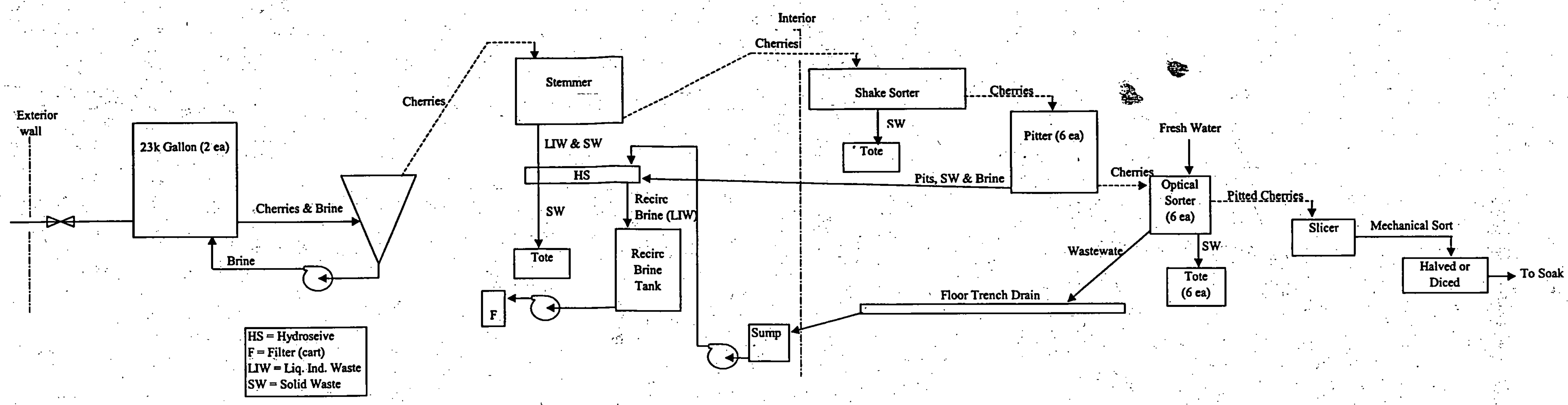
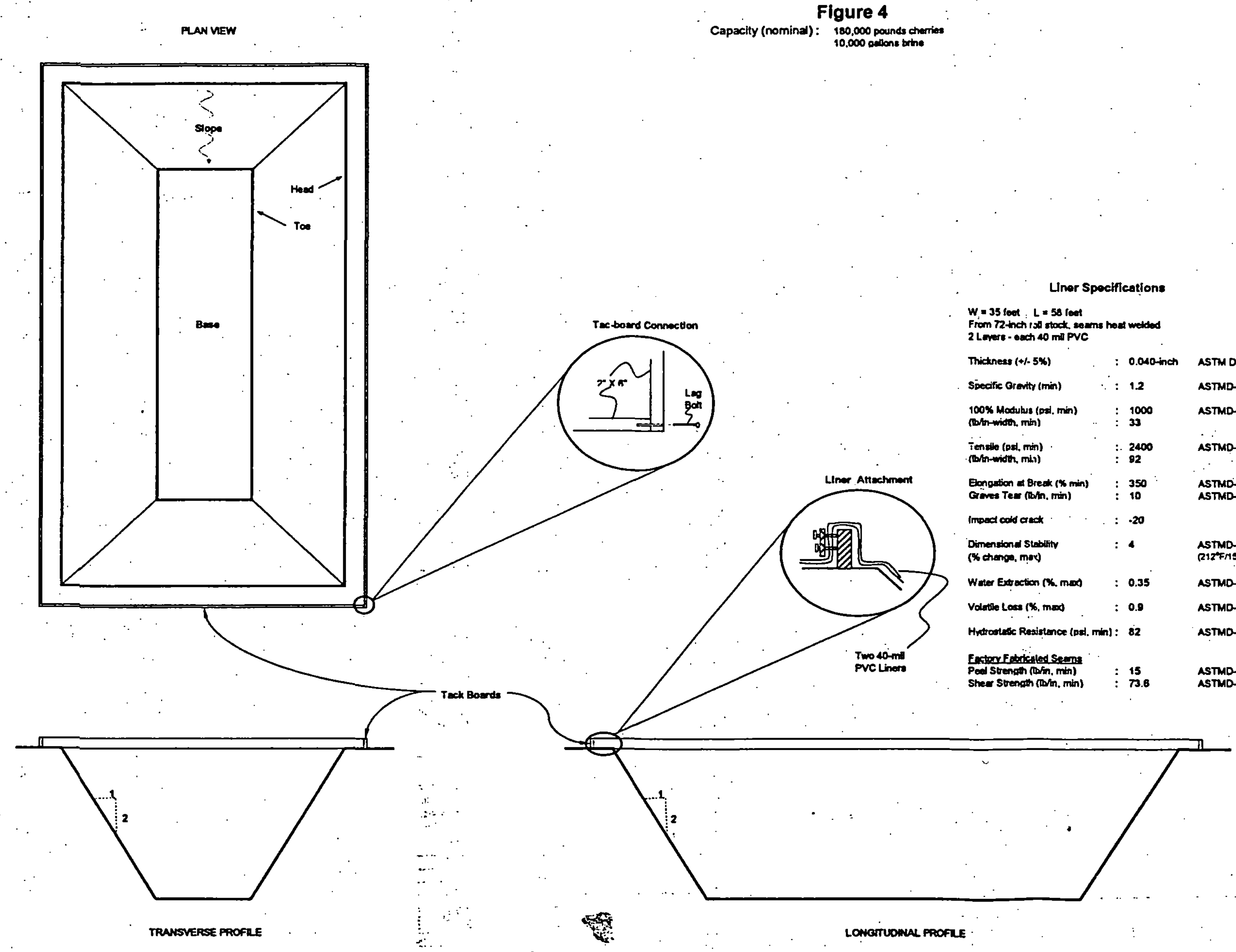


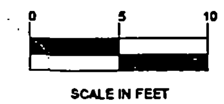
FIGURE 3

CHERRY BRINING PIT SCHEMATIC

Figure 4

Capacity (nominal) : 180,000 pounds cherries
10,000 gallons brine





Liner Specifications

W = 35 feet ; L = 58 feet
From 72-inch roll stock, seams heat welded
2 Layers - each 40 mil PVC

Thickness (+/- 5%)	:	0.040-inch	ASTM D-1593
Specific Gravity (min)	:	1.2	ASTMD-792
100% Modulus (psi, min)	:	1000	ASTMD-882
(lb/in-width, min)	:	33	
Tensile (psi, min)	:	2400	ASTMD-882
(lb/in-width, min)	:	92	
Elongation at Break (% min)	:	350	ASTMD-882
Graves Tear (lb/in, min)	:	10	ASTMD-1004
Impact cold crack	:	-20	
Dimensional Stability (% change, max)	:	4	ASTMD-1204 (212°F/15 min)
Water Extraction (%, max)	:	0.35	ASTMD-3083
Volatile Loss (%, max)	:	0.9	ASTMD-1203 (A)
Hydrostatic Resistance (psi, min)	:	82	ASTMD-751 (A)
<u>Factory Fabricated Seams</u>			
Peel Strength (lb/in, min)	:	15	ASTMD-882
Shear Strength (lb/in, min)	:	73.6	ASTMD-882

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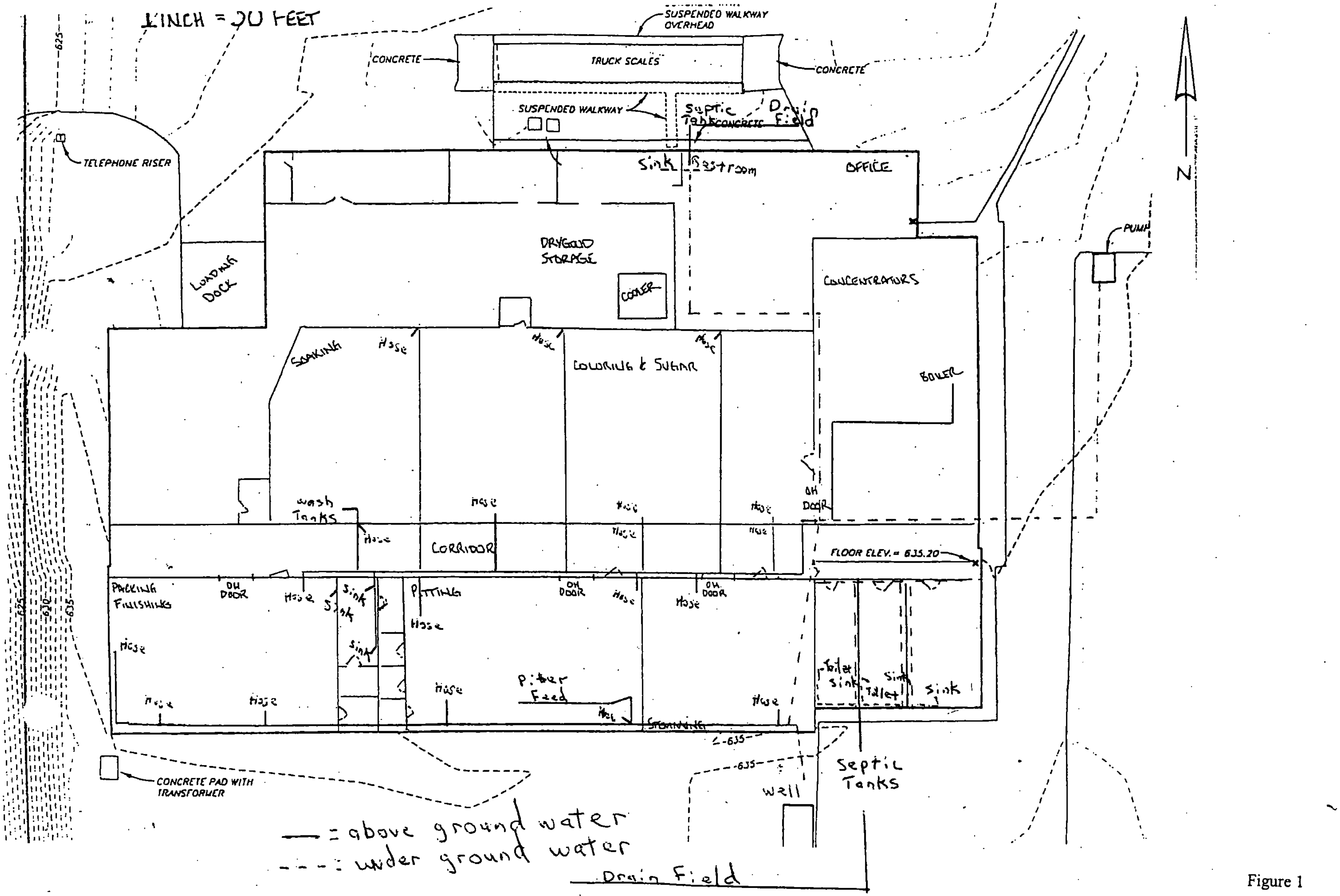
810-487-0555

REVISIONS				
DATE	BY	DESC.	DRAWN BY :	TAC
			FIELD BY :	AJS
			CHECKED BY :	AJS
			SCALE :	See Dimensions
			DATE :	7/26/2002
			PROJECT # :	0239908411
			FIGURE # :	Cherry Pit
			ADAPTED FROM:	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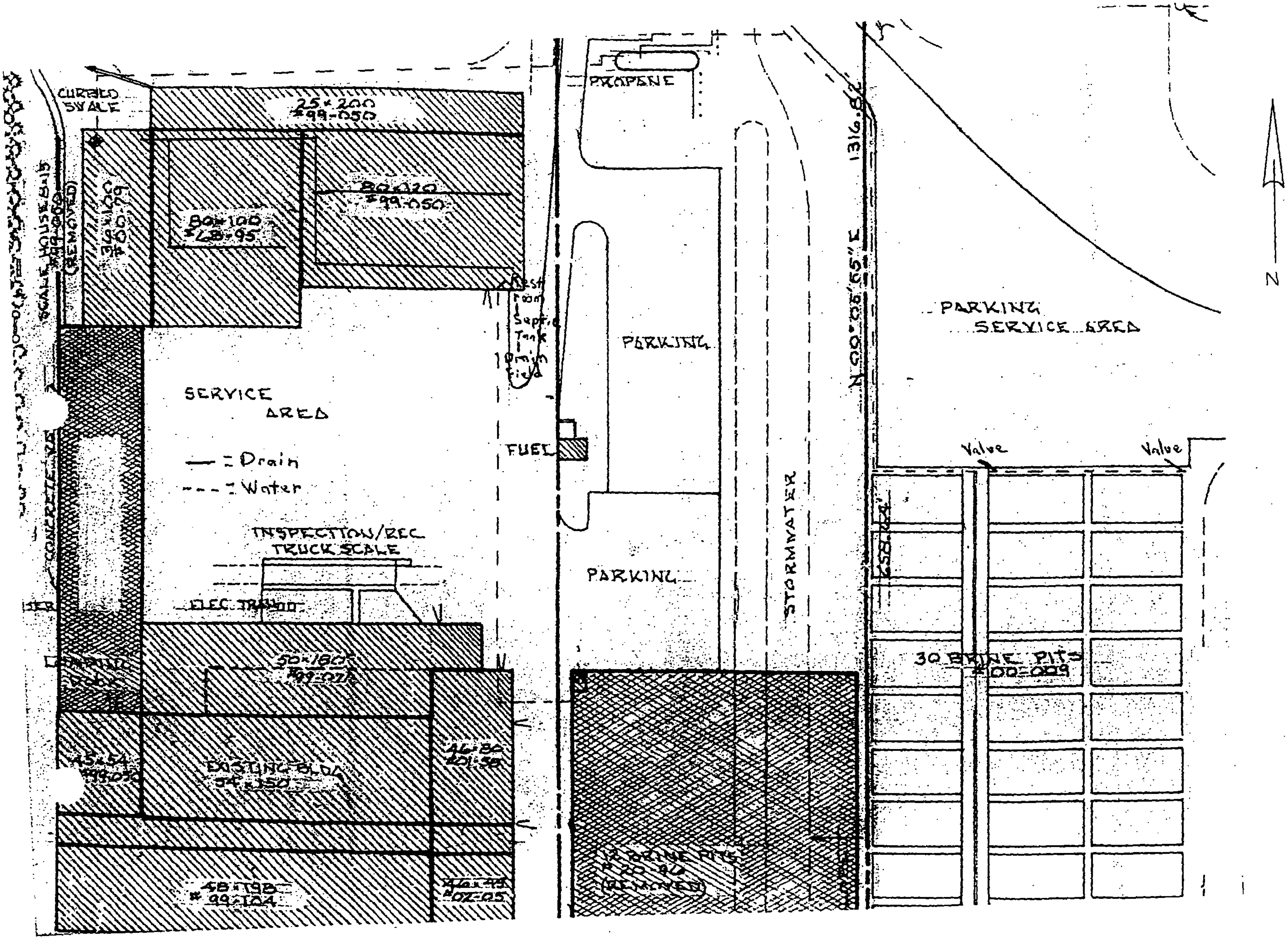
CONCRETE
SUSPENDED WALKWAY
Septic Tank
CONCRETE
Drain Field
TELEPHONE RISER
Sink
Restroom
OFFICE
PUMP
DRYGOOD STORAGE
LOADING DOCK
COOLER
CONCENTRATORS
SOAKING
Hose
COLORING & SUGAR
BOILER
wash Tanks
OH DOOR
CORRIDOR
FLOOR ELEV. = 635.20
PACKING FINISHING
PITTING
Sink
Toilet
Piter Feed
STEMMING
635
Septic Tanks
well
CONCRETE PAD WITH TRANSFORMER
— : above ground water
- - - : under ground water
Drain Field

Figure 1



CURBED SWALE
25 x 200
#99-050
80 x 100
#28-95
80 x 120
#99-050
PROPANE
PARKING
SERVICE AREA
— = Drain
- - - = Water
INSPECTION/REC
TRUCK SCALE
ELEC TRANSD
FUEL
PARKING
STORMWATER
1316.8
N
PARKING
SERVICE AREA
Valve
Valve
30 BRINE PITS
#00-009
50 x 180
#99-072
EXISTING BLDG
54 x 150
45 x 54
#99-050
58 x 198
#99-104

Figure 2

Williamsburg Receiving and Storage
Stemming and Pitting Process

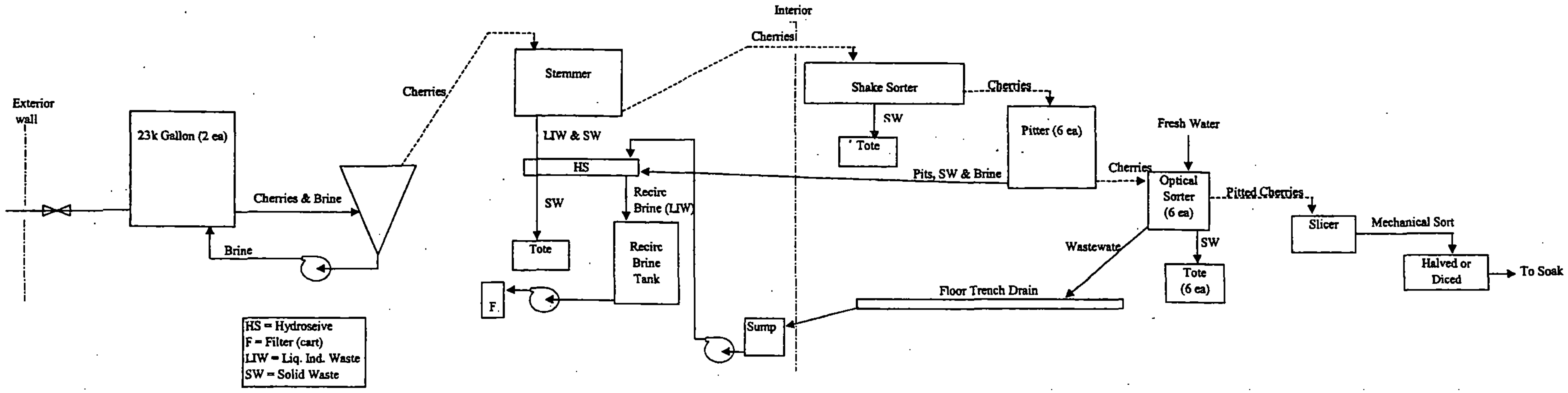


FIGURE 3

Williamsburg Receiving and Storage
Soaking Process

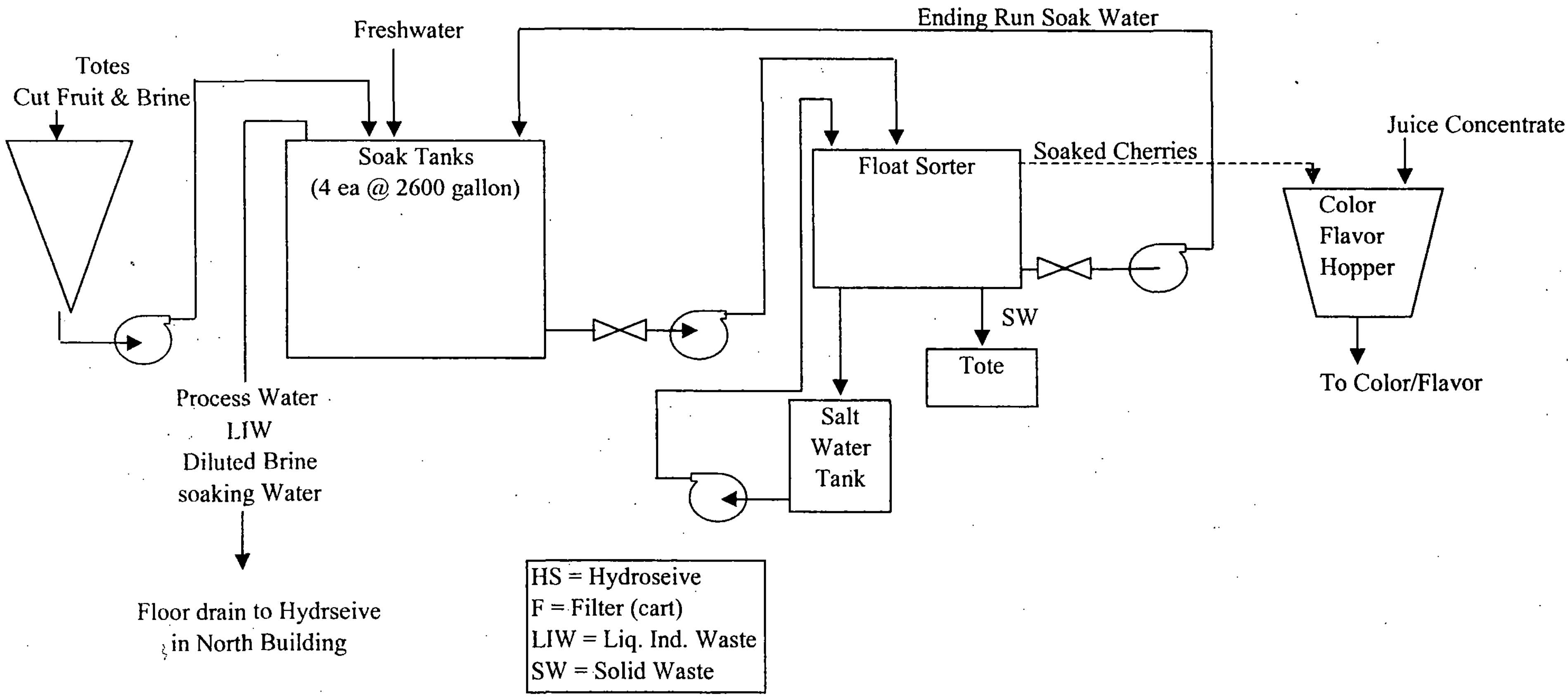


FIGURE 4

Williamsburg Receiving and Storage
Color/Flavor Process

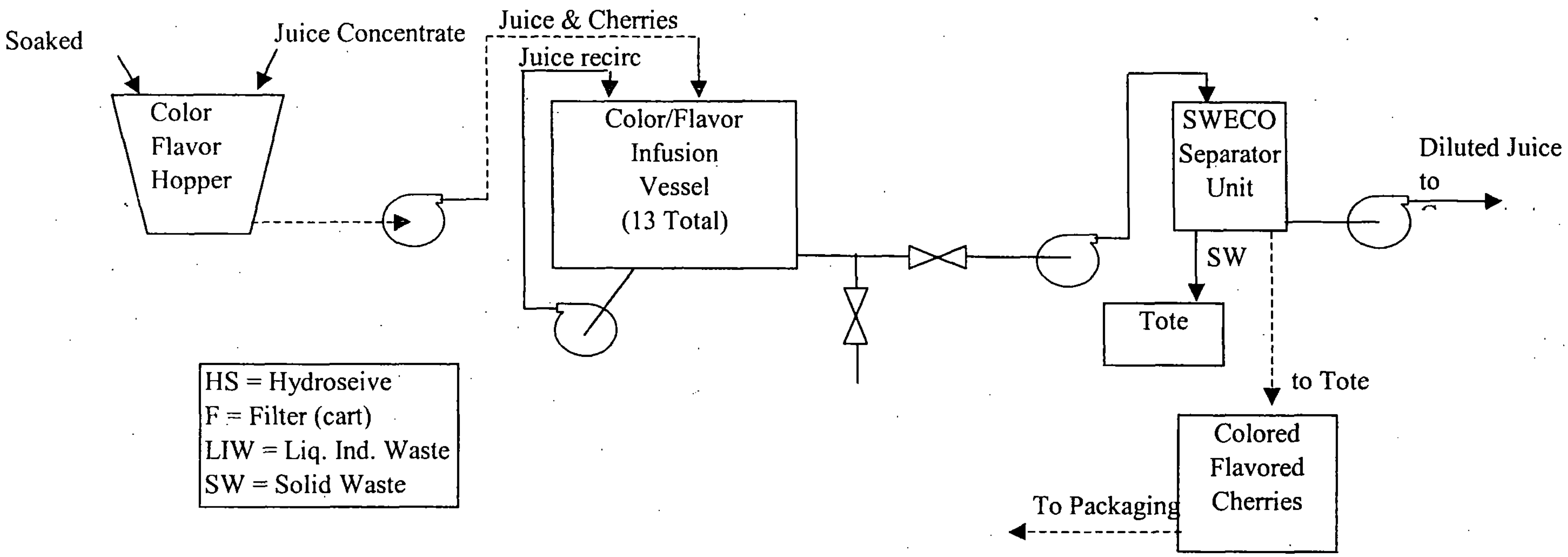


FIGURE 5

Williamsburg Receiving and Storage
Finishing and Packaging Process

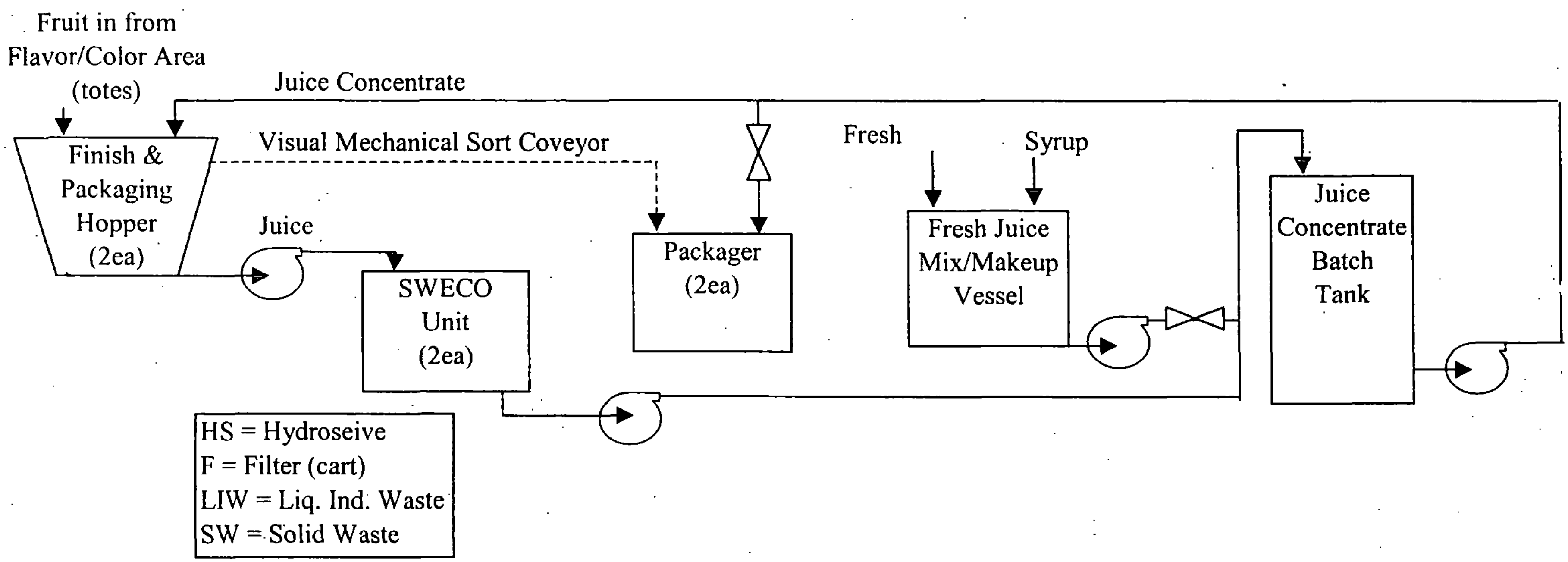


FIGURE 6

Williamsburg Receiving and Storage
Juice Concentrator Process

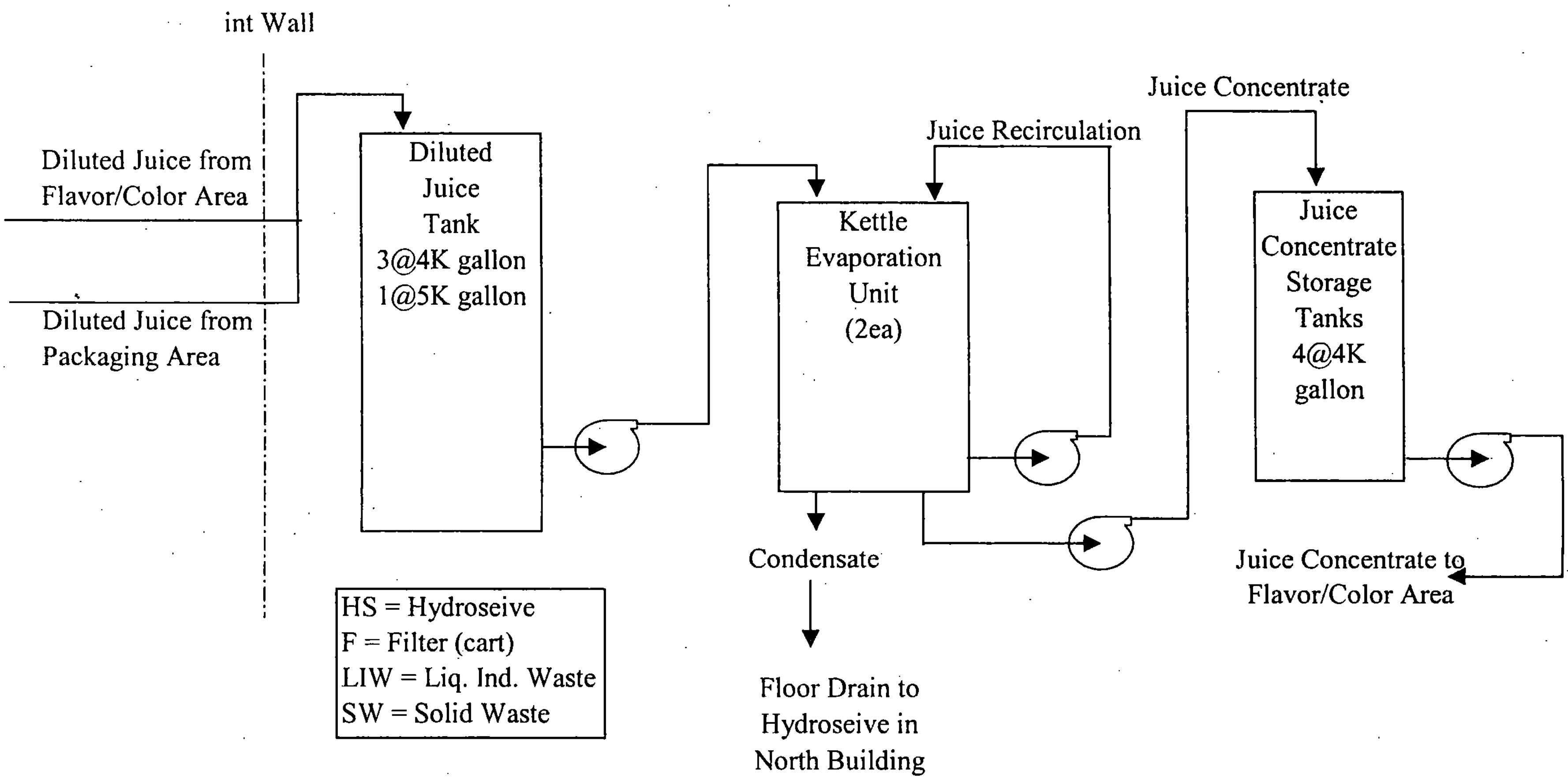
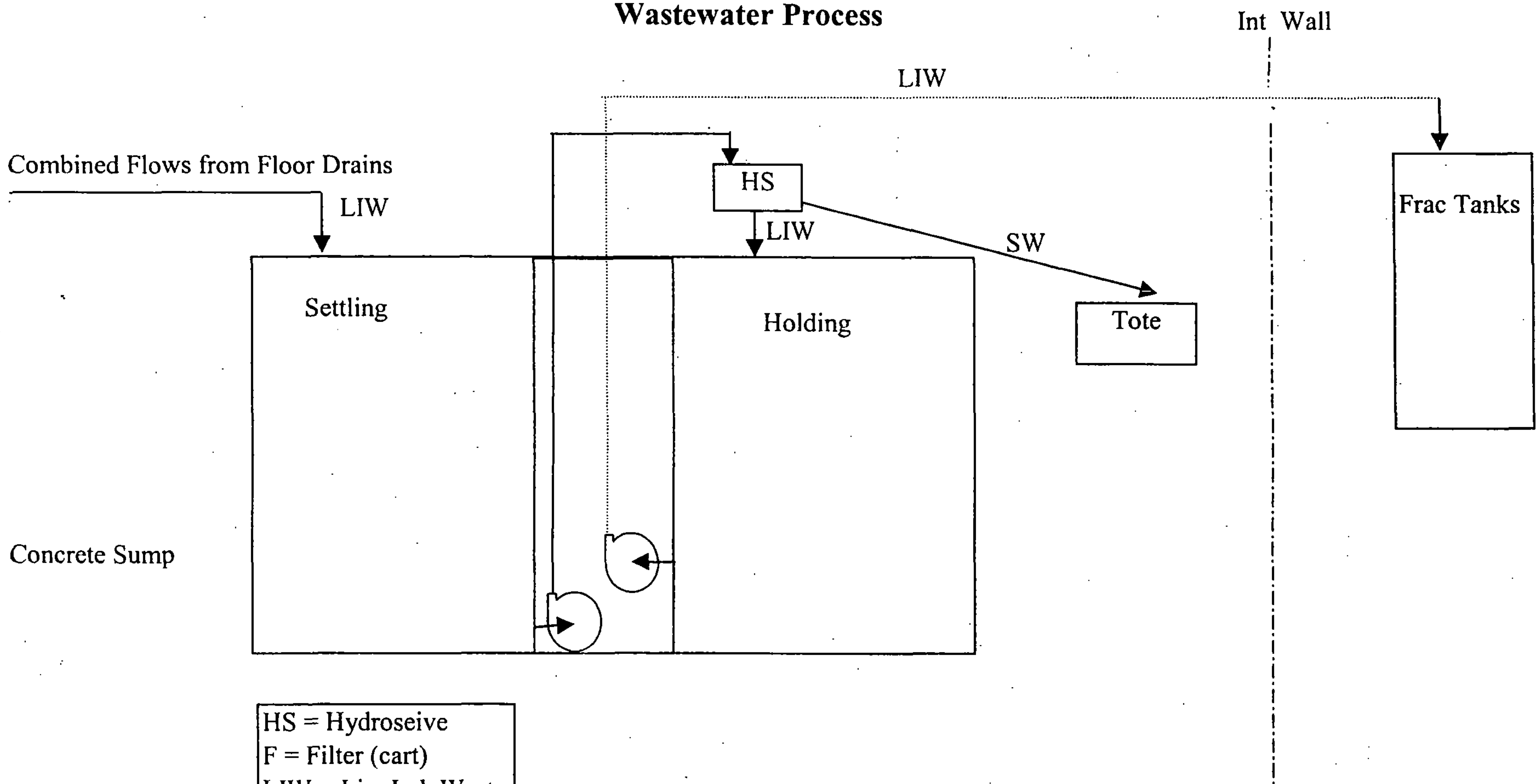


FIGURE 7

Williamsburg Receiving and Storage
Warehouse Maintenance Building (north building)
Wastewater Process



HS = Hydroseive
F = Filter (cart)
LIW = Liq. Ind. Waste
SW = Solid Waste

FIGURE 8

Exemption 9

[redacted]

Guide to Quality Control

Dr Kaoru Ishikawa

Second Revised Edition

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Chapter 7

Control charts I

7.1 What is a control chart?

In the first chapter, we learned about the need for collecting data. In the following chapters we have studied ways of putting the data into order, by use of histograms and check sheets in which all the data are to be consolidated to show an overall picture, and Pareto diagrams which indicate problem areas. These methods group the data for a specified period and express them in a static form. However, in the plant we also want to know more about the nature of the changes that take place over a specified period of time, that is, the dynamic form. **This means that we not only have to see what changes in data occur over time; we must also study the impact of the various factors in the process that change over time. Thus, if the materials, the workers, or the working methods or equipment were to change during this time, we would have to note the effect of such changes on production.** One way of following these changes is by using graphs.

Figure 7.1 is a histogram based on data for synthetic resin parts collected five times a day (the values have been rounded off to make it easier to understand).

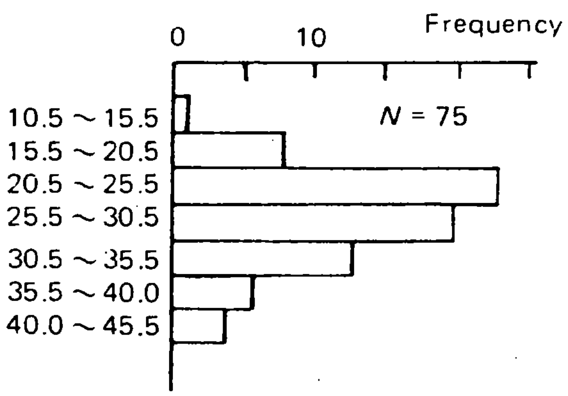

Figure 7.1

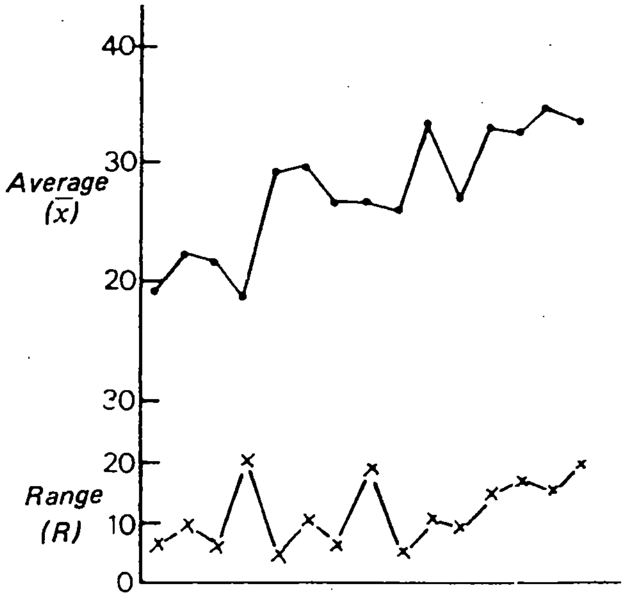

Figure 7.2

Using this data, a graph (figure 7.2) was drawn indicating the average daily value ($\bar{x}$) and daily range (R). It was drawn in the same way as the ordinary broken line graph (cf. p. 51). This graph shows that the values were low at the outset but showed a tendency to rise over time. We could not have learned that fact just by looking at the histogram in figure 7.1. In other words, we were able to obtain new information by looking at the movement of the data.

Now the problem is to find out whether the points on the graph are abnormal or not. For example, the first four points of $\bar{x}$ might be normal or below normal. Thus, when the standards of evaluation are not clear, one is liable to make arbitrary judgement or the one favourable to oneself and the graph cannot be meaningful. **When such irrational evaluations are made, necessary action may be "missed" or unsuitable action may be taken "in haste", thus causing confusion.** This will result in inappropriate conclusions being drawn, thus lowering quality and efficiency.

For this reason, we draw limit lines on the graphs to indicate the standards for evaluation. These lines will indicate the dispersion of data on a statistical basis and let us know when an abnormal situation occurs in production. If we add limit lines to figure 7.2, we obtain the graph in

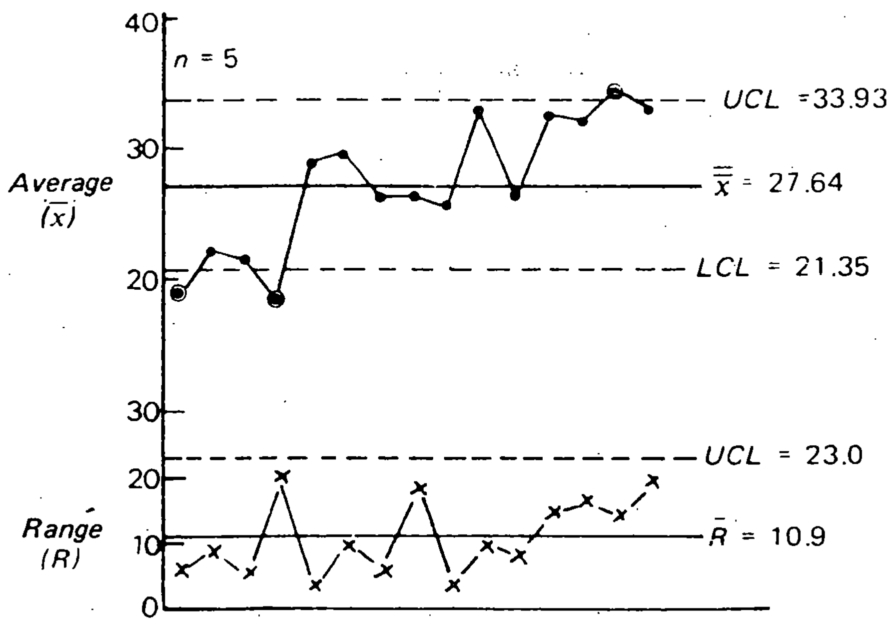

Figure 7.3

figure 7.3. This way we can see if there is any abnormality and take appropriate action. A graph or chart with limit lines is known as a **control chart**, and the lines are called control lines. There are three kinds of control lines: the upper control limit, the central line, and the lower control limit. They can be written as UCL, $\bar{\bar{x}}$ or $\bar{R}$, and LCL corresponding in the same order.

The purpose of drawing a control chart is to determine whether each of the points on the graph is normal or abnormal, and thus know the changes in the process from which the data has been collected. So each point on the graph must correctly indicate from which process the data were drawn.

For example, **in making control charts, the daily data are averaged out in order to obtain an average value for that day. Each of these values then becomes a point on the control chart which represents the characteristics of that given day.** Or, **data may be taken on a lot-by-lot basis.** In this case, the data must be collected in such a way that the point represents the given lot.

The points on a control chart represent arbitrary divisions in the manufacturing process. The data broken down into these divisions are referred to as sub-groups. In figure 7.3, the five measurements made in one day constitute one sub-group. In other words, we have divided the production process into units of one day, daily production has been represented by points on a control chart, and we can now determine whether the process is in a "controlled state" or not.

The role of a group leader is to be fully aware of the characteristics within his purview and to take measures immediately when he detects any abnormality. Thus, in order to carry out his duties effectively, it is most important for him to make control charts by constituting these sub-groups.

7.2 Types of control charts

A control chart's form varies according to the kind of data it contains. Some data are based on measurements such as the measurement of unit parts (in mm), or yields of a chemical process (in g). These are known as 'indiscrete values' or 'continuous data'. Other data are based on counting, such as the number of defective articles or the number of defects. They are known as 'discrete values' or 'enumerated data'. Control charts based on these two categories of data will differ. Table 7.1 shows the kind of control chart to be used in each case, depending on whether it is based on indiscrete values or on discrete values.

Control charts can also be divided into two types according to their usage. As explained above, the control charts we use provide more information than mere data plotted in a chronological sequence: they indicate how **the influence of various factors** (such as materials, men, methods, etc) **changes over a period of time.** If two or more different factors are exerting an influence, we must stratify the data and draw up

Table 7.1 Types of data and control charts

Types of data		Control chart used
Indiscrete		
Examples:	measurements (1/100 mm) volume (cc) product weight (g) power consumed (kwh)	$\bar{x}$-R
Discrete		
Examples:	number of defectives	pn
	fraction defective	p
	second-class product rate	
Examples:	number of pin holes in pieces of plated sheet metal, differing in area; number of foreign particles in pharmaceutical compounds, differing in volumes (when the range in which the defects are possible, such as length, area, volume, etc, is not fixed)	u
	number of pin holes in a specified area; number of foreign particles in a specified volume (when the length, area, volume, etc is fixed)	c

separate charts so that each influence can be studied. For example, when two kinds of material are used, the differences in their characteristics can be seen clearly by having a separate chart for each material. In other words, we can examine the nature of these influences by stratifying the data in accordance with the process factors, or in some cases by changing the grouping method. This use of charts is called "process analysis".

Let us assume that the process analysis has been made and that a controlled state has been achieved. Standardization of working methods is necessary to maintain this state. A control chart with control limit lines enables us to see if this standardization was correct and whether it is being maintained. If it is, then all points on the chart thereafter should be within the control limit lines, which are extended from the controlled state. If points appear on the control chart outside these limits, then some change must have occurred on the assembly or manufacturing line. The cause must be investigated and proper action taken. This use of charts is called "process control" Charts for process analysis and charts for process control are made in the same way, but their purposes differ. The purpose of process analysis is to detect the causes of any dispersion in the process by separating charts for individual items or by changing grouping methods; the purpose of process control is to detect any abnormality in the process by plotting the data day-by-day.

7.3 Making the $\bar{x}$-R control chart

An $\bar{x}$-R control chart is one that shows both the mean value, $\bar{x}$, and the range, R. This is the most common type of control chart using indiscrete values. The $\bar{x}$ portion of the chart mainly shows any changes in the mean value of the process, while the R portion shows any changes in the dispersion of the process. This chart is particularly useful because it shows changes in mean value and dispersion of the process at the same time, making it a very effective method for checking abnormalities in the process (see table 7.2).

Table 7.2 $\bar{x}$-R control chart

Sub-group No.	6:00	10:00	14:00	18:00	22:00	$\bar{x}$	R
1	14.0	12.6	13.2	13.1	12.1	13.00	1.9
2	13.2	13.3	12.7	13.4	12.1	12.94	1.3
3	13.5	12.8	13.0	12.8	12.4	12.90	1.1
4	13.9	12.4	13.3	13.1	13.2	13.18	1.5
5	13.0	13.0	12.1	12.2	13.3	12.72	1.2
6	13.7	12.0	12.5	12.4	12.4	12.60	1.7
7	13.9	12.1	12.7	13.4	13.0	13.02	1.8
8	13.4	13.6	13.0	12.4	13.5	13.18	1.2
9	14.4	12.4	12.2	12.4	12.5	12.78	2.2
10	13.3	12.4	12.6	12.9	12.8	12.80	0.9
11	13.3	12.8	13.0	13.0	13.1	13.04	0.5
12	13.6	12.5	13.3	13.5	12.8	13.14	1.1
13	13.4	13.3	12.0	13.0	13.1	12.96	1.4
14	13.9	13.1	13.5	12.6	12.8	13.18	1.3
15	14.2	12.7	12.9	12.9	12.5	13.04	1.7
16	13.6	12.6	12.4	12.5	12.2	12.66	1.4
17	14.0	13.2	12.4	13.0	13.0	13.12	1.6
18	13.1	12.9	13.5	12.3	12.8	12.92	1.2
19	14.6	13.7	13.4	12.2	12.5	13.28	2.4
20	13.9	13.0	13.0	13.2	12.6	13.14	1.3
21	13.3	12.7	12.6	12.8	12.7	12.82	0.7
22	13.9	12.4	12.7	12.4	12.8	12.84	1.5
23	13.2	12.3	12.6	13.1	12.7	12.78	0.9
24	13.2	12.8	12.8	12.3	12.6	12.74	0.9
25	13.3	12.8	13.0	12.3	12.2	12.72	1.1
						$\Sigma\bar{x} = 323.50$	$\Sigma R = 33.8$
						$\bar{\bar{x}} = 12.940$	$\bar{R} = 1.35$

Here are the steps for making the $\bar{x}$-R control chart.

Step 1. Collect the data. You usually need more than 100 samples. They should be taken from recent data from a process similar to the one that will be used thereafter.

Step 2. Put the data into sub-groups. These sub-groups can be according to measurement or lot order and should include from two to five samples each. The data should be divided into sub-groups in keeping with the following conditions:

a the data obtained under the same technical conditions should form a sub-group;

b a sub-group should not include data from a different lot or of a different nature.

For this reason, data are usually divided into sub-groups according to date, time, lot, etc. The number of samples in a sub-group determines the size of the sub-group and is represented by n; the number of sub-groups is represented by k.

Step 3. Record the data on a data sheet. The data sheet should be so designed that it is easy to compute the values of $\bar{x}$ and R for each sub-group. Table 7.2 gives data on the moisture content of a textile product, taken five times a day. Here $n = 5$ and $k = 25$.

Step 4. Find the mean value, $\bar{x}$. Use the following formula for each sub-group. Compute the mean value $\bar{x}$ to one decimal beyond that of the original measurement value.

$$\bar{x} = \frac{x_1 + x_2 + x_3 \ldots + x_n}{n}$$

For the data in sub-group No. 1, it works out like this:

$$\bar{x} = \frac{14.0 + 12.6 + 13.2 + 13.1 + 12.1}{5} = \frac{65.0}{5} = 13.00$$

And for No. 2,

$$\bar{x} = \frac{13.2 + 13.3 + 12.7 + 13.4 + 12.1}{5} = \frac{64.7}{5} = 12.94$$

Step 5. Find the range, R. Use the following formula to compute the range R for each sub-group:

$$R = x_{(\text{largest value})} - x_{(\text{smallest value})}$$

For sub-groups No. 1 and No. 2 in Table 7.2, R works out to:

$$R = 14.0 - 12.1 = 1.9$$

$$R = 13.4 - 12.1 = 1.3$$

Step 6. Find the overall mean, $\bar{\bar{x}}$. Total the mean values $\bar{x}$, for each sub-group and divide by the number of sub-groups k.

$$\text{Thus, } \bar{\bar{x}} = \frac{\bar{x}_1 + \bar{x}_2 + \bar{x}_3 \ldots + \bar{x}_n}{k}$$

Compute the overall mean value $\bar{\bar{x}}$ to two decimals beyond that of the original measurement value. For the data on Table 7.2 it works out like this:

$$\bar{\bar{x}} = \frac{13.0 + 12.94 + 12.90 \ldots + 12.72}{25} = \frac{323.50}{25}$$

$$= 12.940$$

Step 7. Compute the average value of the range $\bar{R}$. Total R for all groups and divide by the number of sub-groups, k. Thus,

$$\bar{R} = \frac{R_1 + R_2 + R_3 \ldots + R_k}{k}$$

Compute the average value $\bar{R}$ to one decimal beyond that of R. R for the data in Table 7.2 works out to:

$$\bar{R} = \frac{1.9 + 1.3 + 1.1 \ldots + 1.1}{25} = \frac{33.8}{25}$$

$$= 1.35$$

Step 8. Compute the control limit lines. Use the following formulas for $\bar{x}$ and R control charts. However, the coefficients A_2, D_4, D_3 etc are shown in Table 7.3.

Table 7.3

n	A_2	D_4	D_3
2	1.880	3.267	Do not apply
3	1.023	2.575	Do not apply
4	0.729	2.282	Do not apply
5	0.577	2.115	Do not apply
6	0.483	2.004	Do not apply
7	0.419	1.924	0.076

$\bar{x}$ control charts:

Central line CL = $\bar{\bar{x}}$;
Upper control limit UCL = $\bar{\bar{x}} + A_2\bar{R}$;
Lower control limit LCL = $\bar{\bar{x}} - A_2\bar{R}$.

R control charts:

Central line CL = $\bar{R}$;
Upper control limit UCL = $D_4\bar{R}$;
Lower control limit LCL = $D_3\bar{R}$.

For the data on Table 7.2, this works out as:

$$
\begin{aligned}
\bar{x} \text{ control chart CL} &= \bar{\bar{x}} = 12.940 \\
\text{UCL} &= \bar{\bar{x}} + A_2\bar{R} \\
&= 12.940 + 0.577 \times 1.35 \\
&= 12.940 + 0.779 \\
&= 13.719 \\
\text{LCL} &= \bar{\bar{x}} - A_2\bar{R} \\
&= 12.940 - 0.577 \times 1.35 \\
&= 12.161 \\
R \text{ control chart CL} &= \bar{R} = 1.35 \\
\text{UCL} &= D_4\bar{R} \\
&= 2.115 \times 1.35 \\
&= 2.86 \\
\text{LCL} &= D_3\bar{R} \text{ (none)}
\end{aligned}
$$

Step 9. Construct the control chart. Obtain graph paper or control chart paper and set the index so that the upper and lower control limits will be separated by 20 to 30 mm. Draw in the control lines and the numerical values. The central line is a solid line and limit lines for process analysis are broken lines, while limit lines for process control are dotted lines.

Step 10. Plot out the $\bar{x}$ and R points for each sub-group on the same vertical line. Plot the $\bar{x}$ and R values as computed for each sub-group. For the $\bar{x}$ values use a dot (.) and for the R values use an (x). Circle all points which exceed the control limit lines to distinguish them from the others. The dots and the x's should be about 2 to 5 mm apart. Figure 7.4 shows a control chart based on the data in table 7.2.

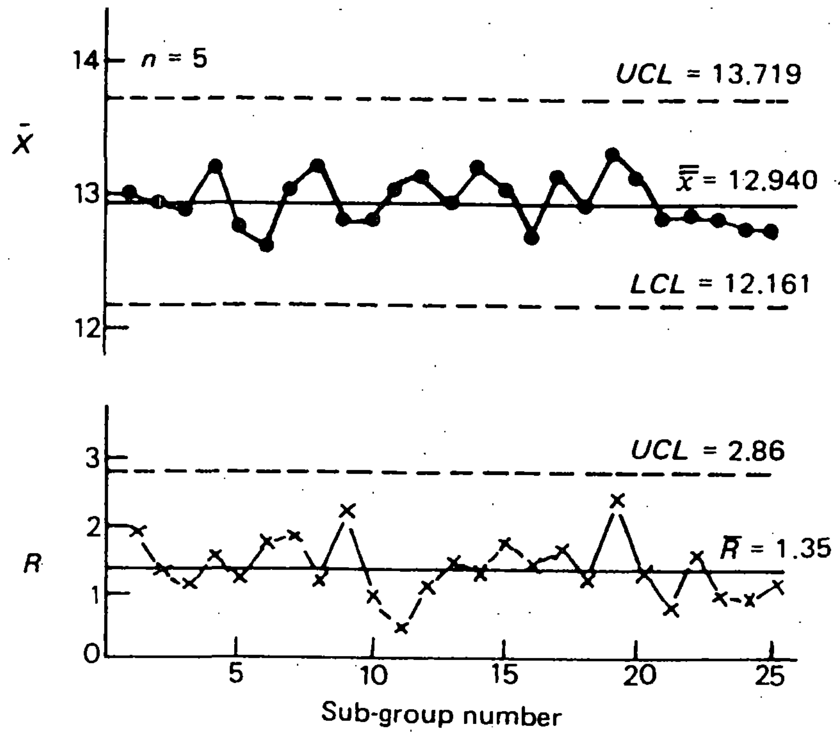

Figure 7.4

Step 11. Write in the necessary information. On the left edge of the control chart write $\bar{x}$ and R, and on the upper left of an $\bar{x}$ control chart write the n value. Also indicate the nature of the data, the period when it was taken, the instruments used, the person responsible, etc.

Chapter 8

Control charts II

8.1 Point movements on $\bar{x}$-R control charts

In chapter 7, we saw how to make $\bar{x}$-R control charts, and in the practice exercises we learned that we can use $\bar{x}$-R control charts to understand changes in a production process.

Before we can actually use a control chart, however, we must know the following things:

a the relationship between the change in the production process and the change (the movement of points) on the control chart;

b the relationship between the degree of change in the production process and the degree of change (movement of points) on the control chart.

Let us try some experiments to learn more about this movement of points on the control chart.

Experiment 1

The total data for one day's production of a certain product serve as the basis for the histogram in figure 8.1. Let's call this 'distribution A'. Write the data on little chips, collect all the chips, and they should display the same distribution as A. Then put them in a large bowl so they can be mixed well (see figure 8.4).

The production process in this factory is stable and the quality of each day's products is represented by distribution A. Now, if we continue production in this manner and measure five (n = 5) samples at random each day, how would the resulting control chart appear?

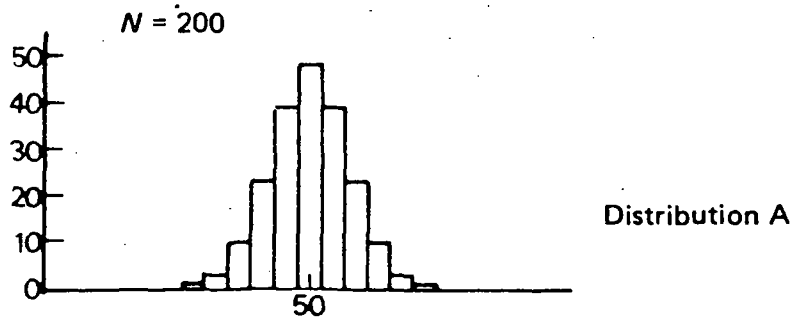

Figure 8.1

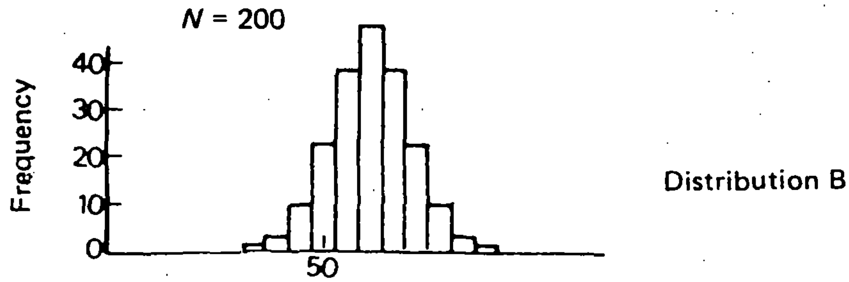

Figure 8.2

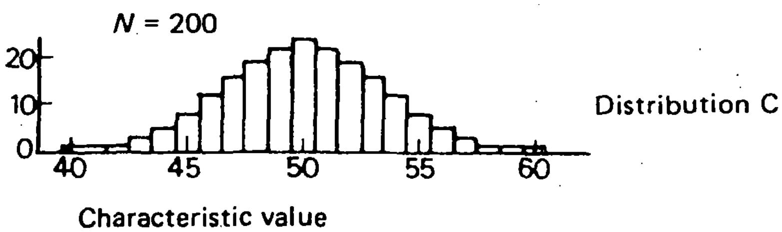

Figure 8.3

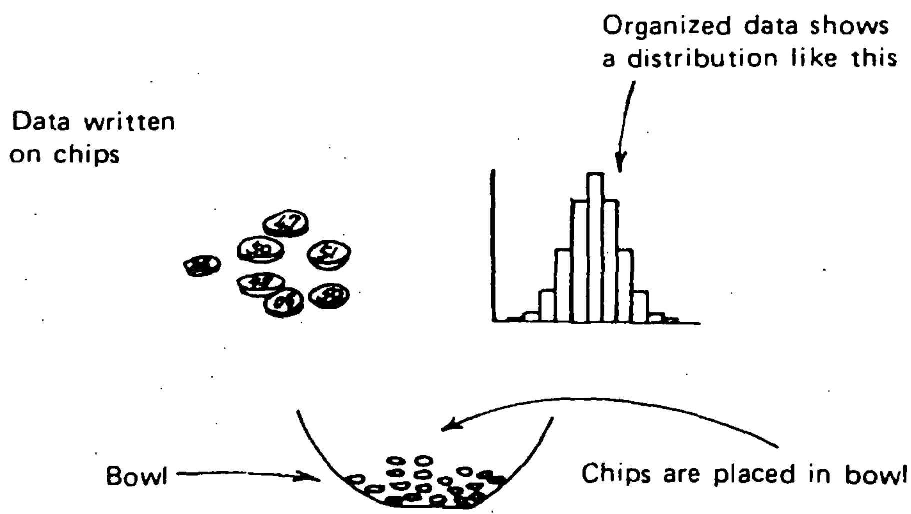

Figure 8.4 Distribution A of chips

It can be assumed that daily production continues to follow distribution A of figure 8.1. Therefore, take five of the A chips at random and use the data on them to work out your control chart. Take data for 25 days (sub-groups) from these chips (i.e., 5 pieces x 25 days = 125 pieces) and use this to construct an $\bar{x}$-R control chart. This chart will look like figure 8.5.

Information obtained from figure 8.5

As can be seen clearly from the control chart, although the production is controlled, $\bar{x}$ and R do show some fluctuation. However, they do not exceed the control limits and there does not seem to be any tendency for the values to assume a particular form.

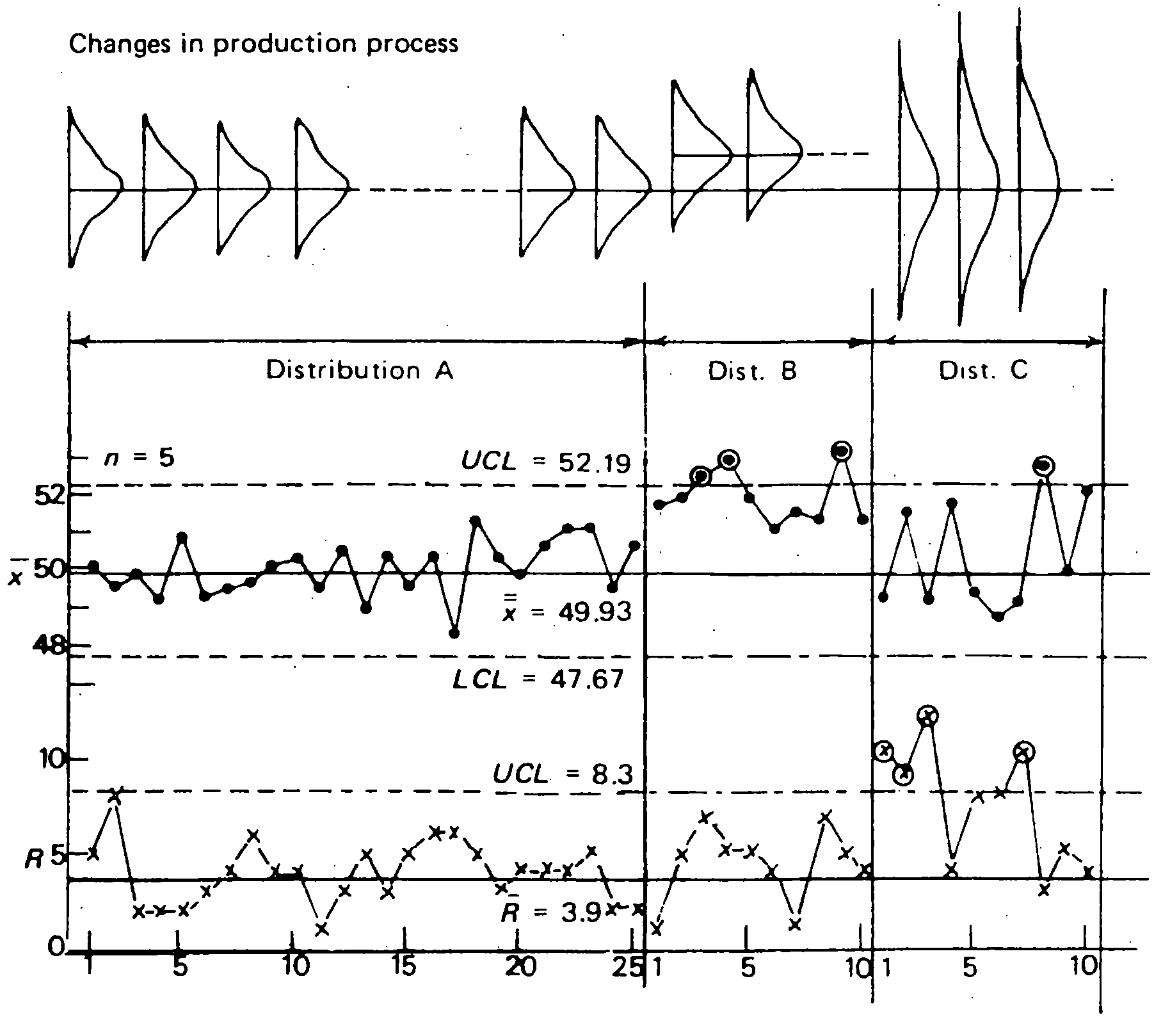

Figure 8.5 | Figure 8.6 | Figure 8.7

If this condition continues, the points on $\bar{x}$-R control charts based on five daily samples will continue to form the same curves shown here. Even if the control limit lines are extended, and points are drawn in based on the data from the distribution A chips, all points will still be within the control lines. There should also be no clustering. The state arising when the production process is stable and there is no abnormality in the points on the control chart is called a *controlled state.*

Experiment 2

When a factor (such as raw materials, machinery, working methods, workers, etc) changes and consequently the mean value of a characteristic of the product shows a slight change, what change will there be in the points on the control chart? Let's assume that distribution A had made a 'plus' movement to the right as in figure 8.2. This distribution will be referred to as B. The data are written on little chips which, when collected, should display the same distribution B. If production is continued as represented by distribution B, we can take the data from the distribution B chips to obtain the process data. Let's take ten days' data from the distribution B chips, at five per day. If we make an $\bar{x}$-R control chart on this basis, it will appear as in figure 8.6. We'll use the control limit lines we used for distribution A.

Information obtained from figure 8.6

As can be seen clearly from figure 8.6, when there is a shift in the mean for a production process (in other words, a shift from distribution A to distribution B), you can readily detect a change in the $\bar{x}$ control chart. In this case, no changes can be seen on the R control chart. The change in the mean of the production process brings about changes in the $\bar{x}$ control chart only. The shift from distribution A to distribution B was a very small one for the production process, but a clear difference can be seen on the control chart.

Experiment 3

Now, let us see what happens to the points on the control chart when the dispersion of the characteristic value of the production process changes. We'll leave the mean at distribution A as it was but make the dispersion greater (figure 8.3).

Let us call this distribution C. Prepare chips in the same manner as we did before so that they will, all together, show distribution C. As in experiment 2, take ten days' data from distribution C at $n = 5$. Continuing on the same control chart as before, the points will appear as in figure 8.7.

Information obtained from figure 8.7

When the dispersion of the production process changes, points on the R control chart show abnormality. Also note that the spread of the points on the $\bar{x}$ control chart becomes greater and some go beyond the control limits.

Conclusion

The results of the experiments are, finally, that a change in the mean for the production process will result in an abnormality appearing on the $\bar{x}$ control chart. When the mean of the production process shifts to the plus side, the points on the $\bar{x}$ control chart will also move to the plus side. Even when the change in the mean of the production process is very slight, the points on the control chart will react appreciably to this change.

Secondly, a change in the dispersion for the production process, on the other hand, results in abnormalities appearing on both the $\bar{x}$ and R control charts. When the dispersion of the production process increases, the points on the R control chart will tend to increase as well. Moreover, the points on the $\bar{x}$ control chart will display a greater spread and there will be cases where the points may go beyond the control limits.

These results can be summarized as in table 8.1.

Table 8.1

Type of chart	Change in the mean of production process	Change of the dispersion
$\bar{x}$ control chart	indicates abnormality	indicates abnormality
R control chart	—	indicates abnormality

The experiments we have just conducted show the movement of points on control charts when there is a change in the production process. In practice, however, we use this the other way around: on the basis of movements of the points on the control chart, we want to see what changes have taken place in the production process. It is thus important that you practise this repeatedly so you can guess what changes have occurred in the production process, as indicated on the upper part of figure 8.5, 8.6 and 8.7, by looking at the movement of the points on the control charts.

8.2 How to read control charts

As stated above, the purpose of making a control chart is to determine, on the basis of the movements of the points, what kind of changes have taken place in the production process. Therefore, to use the control chart effectively, we have to set the criteria for evaluating what we consider an abnormality. When a production process is in a controlled state, as shown in figure 8.5, this means that:

1. All points lie within the control limits, and

2. The point grouping does not form a particular form.

We would therefore know that an abnormality has developed if

a) Some points are outside the control limits (including points on the limit lines), or

b) The points form some sort of particular form even though they are all within the control limits.

The situation is obvious when some of the points are outside the limits, so let us rather concentrate on the above (b) case and set up more detailed standards.

Non-randomness and its evaluation

A. Runs When points line up on one side only of the central line (strictly speaking, the median line), this is called a 'run.' The number of points in that run is called the 'length of the run' (see figure 8.8). In evaluating runs, if the run has a length of 7 points, we conclude that there is an abnormality in the process. Even with a run of less than 6, if 10 out of 11 points or 12 out of 14 points lie on one side, we consider there is an abnormality in the production process. On $\bar{x}$ control charts, the central line and the median line almost correspond, but on R control charts or on p, pn, c and u control charts the proper procedure is to draw in the median line and then evaluate.

B. Trends If there is a continued rise or fall in a series of points, we say there is a 'trend' (see figure 8.9). In evaluating trends, we consider that if 7 consecutive points continue to rise or fall there is an abnormality. Often, however, the points will go beyond the control limits before reaching 7.

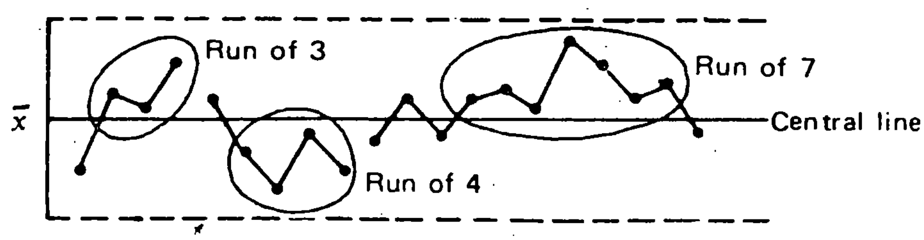

Figure 8.8 Runs

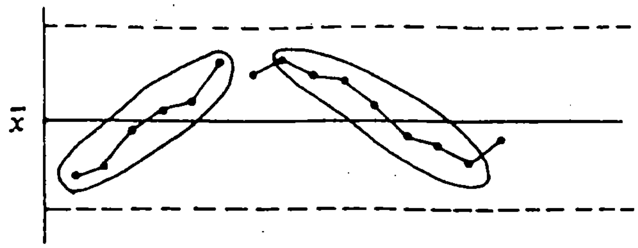

Figure 8.9 Trend

C. Periodicity If the points show the same pattern of change (for example, rise or fall) over equal intervals, we say there is 'periodicity' (see figure 8.10). When it comes to evaluating periodicity, there is no simple method as with runs and trends. The only way is to follow the point movement closely and make a technical decision.

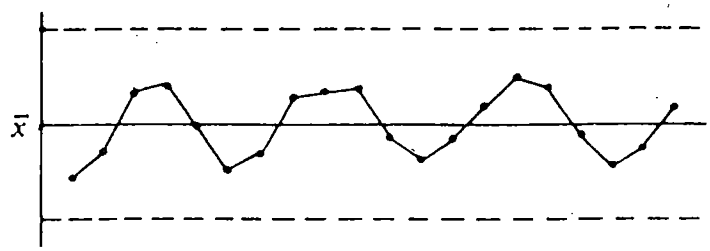

Figure 8.10 Periodicity

D. Hugging of the control line When the points on the control chart stick close to the central line or to the control limit line, we speak of 'hugging of the control line'. Often, in this situation, a different type of data or data from different factors have been mixed into the sub-group. It is therefore necessary to change the sub-grouping, reassemble the data and redraw the control chart. For evaluation, in order to decide whether or not there is hugging of the central line, draw two lines on the control chart, one of them between the central line and the UCL and the other between the central line and the LCL. If most of the points lie between these two lines, there is an abnormality (see figure 8.11). To see whether

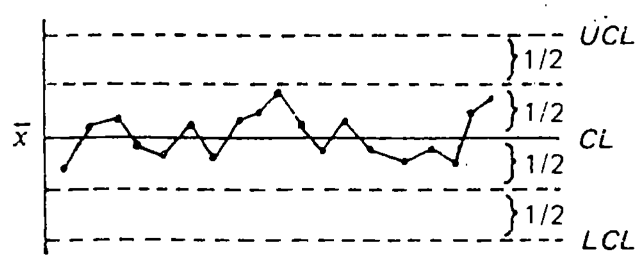

Figure 8.11 Hugging of the central line

there is hugging of the control limit lines, two lines should be drawn at two-thirds of the distance between the central line and control line, from the central line, as in figure 8.12. There is abnormality if 2 out of 3 points, 3 out of 7 points, or 4 out of 10 points lie within the outer one-third zone (see figure 8.12).

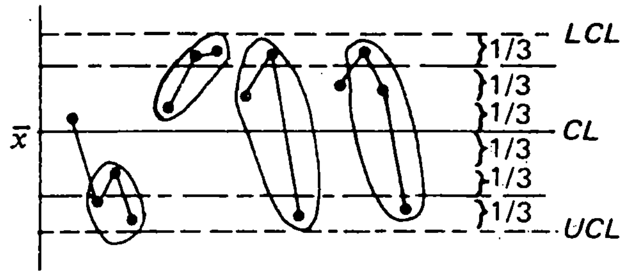

Figure 8.12 Hugging of the control limit lines

8.3 How to draw *p* and *pn* control charts

A *p* chart is one that shows the fraction defective (p), whereas a *pn* chart shows the number of defectives (pn). Basically, they are the same except that a *pn* chart is used when the size of the sub-group (n) is constant and a *p* chart is used when it is not constant. The *p* and *pn* charts are not used together as are the $\bar{x}$-R control charts. This is because *p* and *pn* charts show the characteristics of both the mean and the dispersion of the production process.

First let us see how to construct a *p* chart. Then, for the *pn* chart, the method for finding the control line will be explained.

(1) p chart

Step 1. Collect the data. Get as much data as you can which tell you the number inspected (n) and the number of defective products (pn) You will need at least 20 pairs (see table 8.2).

Step 2. Divide the data into sub-groups. Usually, the data are grouped by date or lots. The sub-group size (n) should be over 50 and the mean value of defectives for each sub-group should range from 3 to 4. Table 8.2 shows fraction defective for electric machines grouped by lots.

Standard Operating Procedure No. 6

Loading and Unloading Transport Vessel

Williamsburg Receiving and Storage
10190 Munro Road
Williamsburg, Michigan

1.0 Introduction

The purpose of this Standard Operating Procedure (SOP) is to determine the Best Management Practices (BMP's) for loading and unloading product at Williamsburg Receiving and Storage

2.0 Referenced Documents

2.1 40 CFR Protection of Environmental, Chapter 1 Environmental Protection Agency, Subchapter D, Part 122- EPA Administered Permit Programs: The National Pollutant Discharge Elimination System

2.2 Standard Operating Procedure No. 2, Brine Transfer

2.3 Standard Operating Procedure No. 5, Spill Response, Pollution Prevention and Countermeasures

3.0 Terminology

3.1 Transport Vessel- Any vehicle that transports fresh cherries, brine cherries, by-products or finished products on local, state or federally maintained properties.

3.2 Absorbent Socks- Any spill prevention measure that will reduce the mobility of a spilled materials outside the desired area.

4.0 Significance and Use

Potential for accidental spills that may encounter storm water is increased during loading and unloading of these products from transport vehicles. Therefore, implementation of this SOP is intended to reduce the possibility of spills during transport of cherries, brine cherries, by-products or finished products.

5.0 Equipment

Spill Response Kit (SOP No. 5)
Fork Lift

6.0 Procedures:

6.1 Unloading of Transport Vehicles:

6.1.1 Fresh cherries into brine pits

i. Transport vessels must remain on impervious surfaces at all times.
ii. Utilize absorbent sock around the truck to provide a "dike" so that any potential spills are prevented from migrating.
iii. Transport cherries into the pits as specified in SOP No.2- Brine Transfer

iv. Respond to any spills as specified in SOP No.5- Spill Response, Pollution Prevention and Countermeasures.

6.1.2 Brine cherries from outside locations

i. Transport vessel to remain on impervious surfaces

ii. If transport vessel is found to be leaking upon arrival, immediately isolate the transport vessel.

a. Surround the truck with absorbent socks or booms

b. Determine the cause of the leaking

c. If possible utilize the wet-dry vacuum of other type device to capture any free liquid.

iii. If no viable signs of leaking are present

a. Back truck into the loading dock

b. Place absorbent socks

6.2 Loading of Transport Vehicles

6.2.1 Inspect the transport vehicle for safety and remaining residue to ensure that the truck is free of previous spills

6.2.2 Inspect the containers to be shipped for any potential spills or leaking containers.

6.2.3 Utilize containment socks around the ramp area, and around the truck to prevent any losses from migrating

6.2.4 Utilize standard industry packing techniques to load the transport vehicle

6.2.5 Inspect the transport vehicle prior to leaving the site

6.2.6 Respond to any spills as directed in SOP No. 5, Spill Prevention.

7.0 Reporting

Transporting Vessel Logs will be maintained in accordance with Williamsburg Receiving and Storages standard of practice, additional reporting is only required by this SOP by reference. For example, spill response.